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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,923	03/18/2004	Philip S. Spoor	D-21408	5421
27182	7590	07/27/2005	EXAMINER	
PRAXAIR, INC. LAW DEPARTMENT - M1 557 39 OLD RIDGEBURY ROAD DANBURY, CT 06810-5113			KERSHTEYN, IGOR	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/802,923

Applicant(s)

SPOOR, PHILIP S.

Examiner

Igor Kershteyn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/18/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Claret (1,776,147).

In figures 1 and 2, Claret teaches a free piston device with a piston 8 having a frequency of reciprocation over a stroke length and with first and second sides facing first and second variable volumes (not numbered), respectively, for containing a working fluid, where the first and second volumes communicate via a clearance seal between the piston 8 and a housing 4 in which it reciprocates, the improvement comprising means for varying the geometry of the clearance seal in a manner coordinated with the cycle of piston reciprocation to produce time-varying seal geometry, such time-varying seal geometry reducing or eliminating the time-averaged flow of working fluid which would otherwise occur, thereby reducing or eliminating drift of the piston 8 from its nominal center along the axis of reciprocation, where the time-varying seal geometry is produced by means comprising a piston 8 with an outer shell 10 which can grow or shrink radially in response to pressure forces, the time-varying seal geometry is produced by means comprising a piston 8 having a sealing surface which at least part

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extends out of the seal 4b during part the reciprocation cycle, where the time-varying seal geometry is produced by means comprising a tapered piston bore 4c, so that the effective seal gap is dependent on piston position in the bore 4c.

Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Macks (2,907,304).

In figure 1, Macks teaches a free piston device with a piston 11 having a frequency of reciprocation over a stroke length and with first and second sides facing first and second variable volumes 18,19, respectively, for containing a working fluid, where the first and second volumes 18,19 communicate via a clearance seal 29 between the piston 11 and a housing 12 in which it reciprocates, the improvement comprising means for varying the geometry of the clearance seal 29 in a manner coordinated with the cycle of piston 11 reciprocation to produce time-varying seal geometry, such time-varying seal geometry reducing or eliminating the time-averaged flow of working fluid which would otherwise occur, thereby reducing or eliminating drift of the piston 11 from its nominal center along the axis of reciprocation, the time-varying seal geometry is produced by means comprising a piston cylinder (not numbered) having an inner diameter which is bounded by fluid in the clearance seal 29, and at least part of the piston outer diameter is bounded by working fluid undergoing pressure oscillations, so that the cylinder diameter and the clearance seal 29 gap grow or shrink in response to oscillating pressure forces.

Prior Art

Prior art made of record but not relied upon is considered pertinent to Applicant's disclosure and consist of two patents.

Wideman (1,762,602) is cited to show a cylinder having a piston with a shell seal but the clearance between the cylinder bore and the piston is not affected by the pressure in a working chamber.

McConnaughey (2,895,773) is cited to show a cylinder having a piston with a shell seal but the clearance between the cylinder bore and the piston is not affected by the pressure in a working chamber.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kershteyn whose telephone number is **(571)272-4817**. The examiner can be reached on Monday-Friday from 8:00 a.m. to 4:30 p.m.

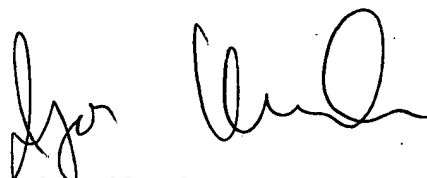
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached on **(571)272-4820**. The fax number is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308 0861.

IK

July 22, 2005

A handwritten signature in black ink, appearing to read 'Igor Kershteyn', written over a horizontal line.

Igor Kershteyn
Patent examiner.
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